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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/940,053	08/27/2001	Vasilis Papanikolaou	764164605017	4427
24325	7590	08/09/2005	EXAMINER	
STEPHEN D. SCANLON			CHANG, EDITH M	
JONES DAY			ART UNIT	
901 LAKESIDE AVENUE			PAPER NUMBER	
CLEVELAND, OH 44114			2637	

DATE MAILED: 08/09/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 09/940,053	<b>Applicant(s)</b> PAPANIKOLAOU ET AL.	
	<b>Examiner</b> Edith M. Chang	<b>Art Unit</b> 2637	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 29 March 2005.
- 2a) ☐ This action is FINAL.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 2-4,6-34 and 38-47 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 2-4,6-17,21,23-25,27-32,38,40 and 42-45 is/are rejected.
- 7) ☒ Claim(s) 18-20,22,26,33,34,39,41,46 and 47 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 March 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Specification***

1. The disclosure is objected to because of the following informalities: Page 9, line 15, the "input signal 210" should be "input signal 220".

Appropriate correction is required.

### ***Claim Objections***

2. Claims 22, 39, 41, 46 and 47 are objected to because of the following informalities:

Claim 22, line 15: "stages" should be "stage".

Claim 39, line 4 & Claim 41, line 19: "the first" should be "the first frequency range".

Claim 46 and 47 are dependent on the objected claim 22.

Appropriate correction is required.

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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4. Claims 2-4, 6-11, 15-17, 21, 23-25, 27-32, 38, 40, 42-43 and 44-45 are rejected under 35 U.S.C. 103(a) as being unpatentable over admitted prior art (APA) in view of Cranford, Jr. et al. (US 5,940,441).

The APA discloses an equalizer 100 in Fig.9 used to compensate for loss resulting from the non-idealities of a transmission medium (page 1 lines 12-13, the specification) wherein the loss is approximated by a loss transfer function (page 2 lines 5-7, the specification) in the frequency domain and the equalizer is approximated by the inverse loss transfer function (page 2 lines 14-17, the specification) in the frequency domain. Since the data rate is corresponded the frequency (page 7 lines 3-4), the transfer function of the equalizer as a function of a data rate.

Regarding **claims 6, 8-9, 38 & 40**, in FIG. 9, the equalizer (with its method) comprises an *equalizer core 102* coupled to the input signal DATA IN from a TRANSMISSION MEDIUM 110; a slicer 104 coupled to the CORE OUT 112 and converting the CORE OUT to DATA OUT 114; and an automatic gain control (AGC) loop 106 coupled to the CORE OUT and DATA OUT and generate a control signal  $K_i$ . The BPF 116 and BPF 120 of the AGC loop 106 *limit/isolate* a bandwidth of the CORE OUT and the DATA OUT and compares the output from BPF 120 and the output from BPF 116 to generate a difference  $K$  (an energy difference), however, the APA does not specify the bandwidth control signal in its control signal  $K_i$  generated by the energy difference  $K$ .

Cranford teaches an equalizer using a continuous-time filter to generate the gain 210 and the bandwidth 212 controls to compensate the losses incurred in the

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transmission medium in FIGURE 2, FIGURE 4 and Abstract lines 5-10. In FIGURES 3, the control signal 116 is generated by comparing the received signal and the signal reference 306 (column 5 lines 23-26) including a frequency/bandwidth and voltage/gain references (column 5 lines 27-30), wherein the control signal 116 comprises the gain control VG 310 to control the frequency dependent gain (FIGURE 4 & column 7 lines 1-5) and the bandwidth control Vc 312 (FIGURE 3) to *control/vary* the frequency response of the continuous-time filter (column 4 line 65-column 5 line 1).

As the APA and Cranford try to provide an equalizer with a transfer function controllable by a control signal to compensate for distortion in the signal caused by the transmission medium (Abstract Cranford & lines 1-5 page 7 of the specification of the current application), it would have been obvious to a one of ordinary skill in the art at the time the invention was made to have the equalizer using the compared output K from the comparator 124 of the APA as the compared output of the PEAK DETECTOR 304 of Cranford to generate the control signal with the bandwidth control as well the gain control taught by Cranford in APA's equalizer, so that the AGC system generates both the gain and the bandwidth controls for the purpose of utilizing at most two parameters gain and bandwidth (column 2 lines 10-15) to compensate for loss and distortion of the input signal caused by the cable and tuning the integrated continuous-time filter (the equalizer) to compensate for semiconductor process variations (column 2 lines 40-45).

The AGC of the combined/modified equalizer provides gain control and bandwidth control based on the energy difference as recited in the claims.

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Regarding **claim 2**, the APA's system modified with Cranford's teaching teaches the control signal ( $V_G$  &  $V_C$  FIGURE.3 '441) with the gain control and bandwidth control generated by the signal K (a single-stage gain control signal) varies the bandwidth of the transfer functions as a function of a data rate (frequency) of the DATA IN (FIGURE 7 '441 & Fig.3 APA).

Regarding **claim 3**, the APA's system modified with Cranford's teaching teaches the equalizer with its transfer function to compensate the distortion occurred in the transmission, hence the compensation is the inverse of the distortion (page 2 lines 5-7 & lines 14-17, the specification).

Regarding **claim 4**, the APA's system modified with Cranford's teaching teaches the control signal 116 comprises the gain control  $V_o$  to control the frequency dependent gain (FIGURE 4 & column 7 lines 1-5 '441).

Regarding **claim 7**, in Fig.9, the APA teaches the AGC loop 106 providing a gain control signal  $K_i$  generated by the energy difference K and coupled to the CORE 102 to control the gain of the equalizer transfer function.

Regarding **claims 10-11, 42-43 & 44-45**, the APA system modified with Cranford's teaching teaches the transmission medium is a coaxial cable and a printed circuit board trace as stated in column 1 line 15 and column 2 lines 25-30 '441.

Regarding **claims 15-17**, the APA system modified with Cranford's teaching teaches in FIGURE 4 of '441, the implementation of the equalizer core 102 FIGURE 1, which is a variable filter shown in FIGURE 4, further Cranford teaches the variable filter

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is a variable low-pass filter (column 3 lines 17-20) with two poles and one-zero that the transfer function having a pole frequency controlled by the bandwidth control signal.

Regarding **claims 21 & 23-24**, the APA system modified with Cranford's teaching teaches in FIGURE 4 of '441, the equalizer core being a multi-stage core having a plurality of individual equalizer core stages (column 6 lines 11-20 '441) wherein each stage supply a transfer function  $G_m$  (as shown in FIGURE 5 '441) substantially equaling portion of the gain of the transfer function.

Regarding **claims 25 & 27**, the modified APA system with Cranford's teaching teaches a BPF 116 (first filter) and ENVELOPE DETECTOR 118 (first envelope detector) coupled to the CORE OUT 112, a second BPF 120 and ENVELOPE DETECTOR 120 (second envelope detector) coupled to the DATA OUT 114, and the AGC compares the output from the BPF 116 (or the first ENVELOPE DETECTOR 118) with the output from the BPF 120 (or the second ENVELOPE DETECTOR 120) to generate the control signal ( $V_G$  &  $V_C$  FIGURE.3 '441) with the gain control and bandwidth control.

Regarding **claim 28**, it is well known in the art that the APA envelope detectors (118 & 122 Fig.9) can use a rectifier or can be a square-law detector.

Regarding **claims 29-30 & 31-32**, the modified APA system with Cranford's teaching teaches the control signal ( $V_G$  &  $V_C$  FIGURE.3 '441) with the gain control and bandwidth control generated by the signal K (a single-stage gain control signal) generated by the adder 124 (Fig.9 APA) comparing the COURE OUT 112 and DATA OUT 114, and provided to a sequencer 126.

5. Claims 12-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over APA in view of in view of Cranford, Jr. et al. (US 5,940,441) as applied to claim 6 above, and further in view of Schneider (US 5,184,292).

Regarding **claims 12-14**, APA does not specify the closed loop controller type, however Schneider teaches the well-known techniques of closes loop controller type in FIG.2. and column 1 lines 35-45. It would have been obvious to a one of ordinary skill in the art at the time the invention was make to use the techniques taught by Schneider in APA's AGC loop for the purpose of having a closed-loop control with high speed and accuracy (column 2 lines 20-25).

***Allowable Subject Matter***

6. Claims 18-20, 26, 33-34 and 39 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims and overcome the objections set forth in this office action.

7. Claims 22, 41, 46 and 47 would be allowable if rewritten or amended to overcome the objection(s), set forth in this Office action.

8. The following is a statement of reasons for the indication of allowable subject matter:

The prior art of record fails to teach or suggest, alone or in a combination, among other things, at least an equalizer and its method as a whole, the combination of

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elements and features, which includes a bandpass control signal, generated based on a single-stage gain control signal which is provided as the difference energy of an input data and an output data, to vary a first frequency range of the input data in proportion to the single-stage gain control signal and a second frequency range of the output data in proportion to the single-stage gain control signal; or a plurality of individual-stage bandwidth control signals coupled to one of a plurality of individual equalizer core stages of a equalizer core to vary the bandwidth of the transfer function of the equalizer core.

### ***Conclusion***

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Reference Limberg (US 6,061,096) as the well-known art describes the envelope detector using a rectifier (column 11 lines 37-40).

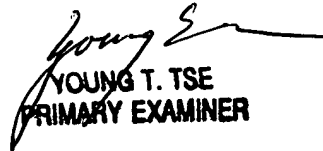
10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Edith M. Chang whose telephone number is 571-272-3041. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jay K. Patel can be reached on 571-272-2988. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Edith Chang  
August 7, 2005

  
YOUNG T. TSE  
PRIMARY EXAMINER